

2011 PMOC Annual Meeting

RISK MANAGEMENT

OP-40 guidelines and practice

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Objective

The purpose of this session is to walk through the various steps of the OP-40 Risk Review procedures, and to discuss:

- The basic guideline
- The practice of the guideline in constrained conditions
- Examples of the guideline in practice

There will be a quiz!!!

Agenda

The grantee/PMOC roles in project risk management	10:45-11:15
OP-40 mechanics:	
• Project status evaluation: characterizing or baselining the project	11:00-11:35
• Identification and Categorization of Risks – Risk Register	11:35-12:00
<i>Lunch</i>	
• Risk Assessment	01:00-02:00
• Risk Mitigation	02:00-3:00
<i>Break</i>	
OP-40 management:	
• Development of Grantee's Risk and Contingency Management Plan (RCMP)	03:15-03:45
• Risk review report	03:45-04:15
• PMOC's Monitoring of Grantee's Risk and Contingency Management Plan	04:15-04:45
Organizing the risk review	04:45-?

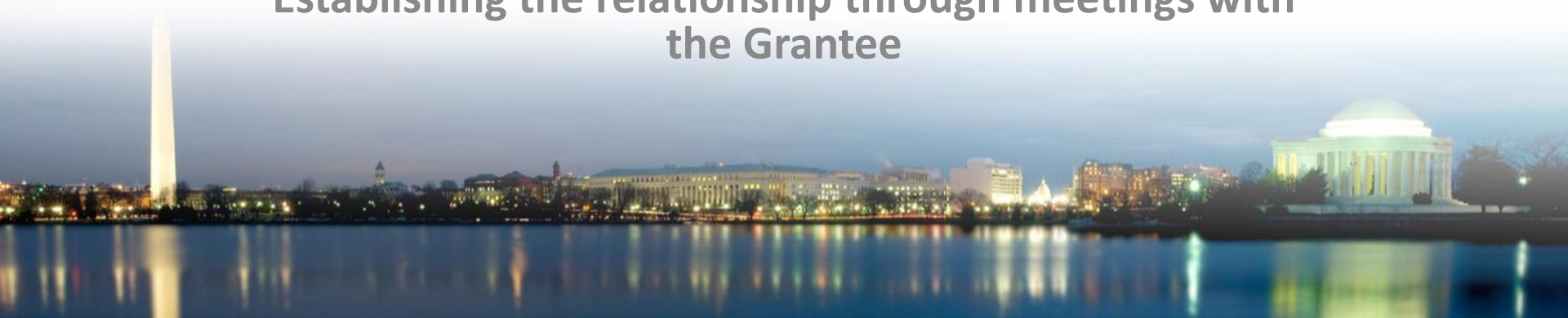
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The grantee/PMOC roles in project risk management

The Grantee as risk manager

The PMOC as risk auditor for the FTA and as Grantee risk process reviewer

Establishing the relationship through meetings with the Grantee



The Grantee as risk manager

The PMOC as risk characterizer for the FTA and as Grantee risk process reviewer

Establishing the relationship through meetings with the Grantee

THE GRANTEE/PMOC ROLES IN PROJECT RISK MANAGEMENT

The Grantee's role

- 6.6 Development of Grantee's Risk and Contingency Management Plan (RCMP)
 - the Grantee prepares and/or revises the Risk and Contingency Management Plan (RCMP)
 - develops as a section of the PMP
 - a recommended structure for the RCMP contents is included in Appendix G:
 - Primary Mitigation, organized by significant project activities;
 - Insurance;
 - Contingency Management;
 - Secondary Mitigation;
 - Risk Management.

The PMOC's role

- (1.0) Purpose of OP40:
 - review, analyze, recommend and report as regards:
 - risk associated with the Grantee's project, and;
 - the Grantee's plan for mitigating and managing risks.
 - makes available to the Grantee the assessments and recommendations for inclusion in the Grantee's Risk and Contingency Management Plan (RCMP) (6.6)
 - work collaboratively with the Grantee (6.6)
- See also Section 6.1

Risk review meetings

- (6.1) Interface with the Grantee:
 - facilitates the process and
 - provides the Grantee with the background
 - a typical structure for Grantee interface meetings is presented in Appendix C:
 - Kickoff meeting: getting to know each other, the project, expectations and process;
 - Workshop 1 (may be broken into two sessions): project evaluations, risks identified by all parties, broad quantification, potential mitigations, next steps;
 - Workshop 2: risk assessment process and summary results, detail of problematic risks, further mitigation discussion, action items, next steps.

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OP-40 mechanics:

Project status evaluation: characterizing or baselining the project

Identification and Categorization of Risks – Risk Register

Risk Assessment

Risk Mitigation



Grantee's submittals

Fundamental project evaluations, such as TCC, Scope, Estimate, Schedule. Etc.

Contractual Risk Allocation Review

PROJECT STATUS EVALUATION: CHARACTERIZING OR BASELINING THE PROJECT

Grantee's submittals

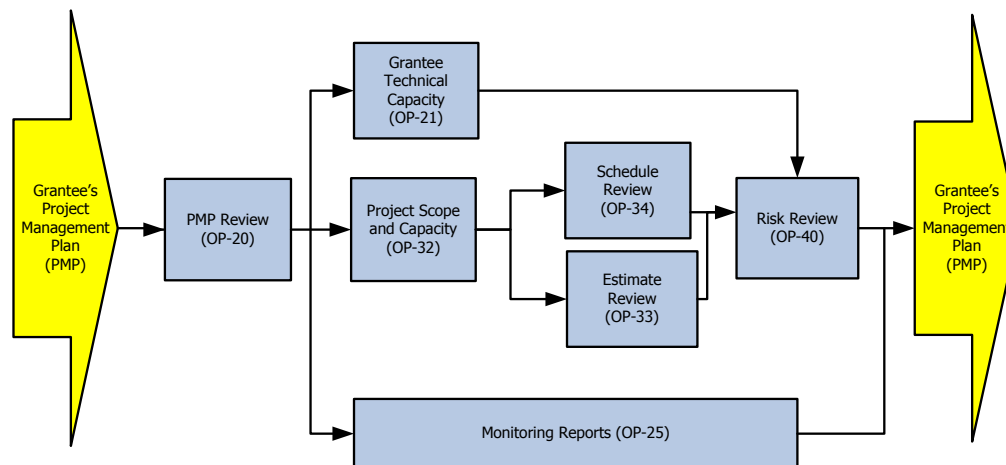
5.0 GRANTEE'S SUBMITTALS

- listed in Appendix B, but should be customized for each project
- The documents also apply to other OPs
- notify the FTA of important discrepancies in the project information

One of the major causes of OP40 delay

Establishing the baseline

- 6.1 The risk management review builds upon the review of scope, schedule, cost, and Grantee technical capacity and capability in other OPs.
- 6.2 Project Status Evaluation
 - the necessary first step is to scrutinize the status and soundness of the project's basic—and known—elements. It is crucial that these known project elements be validated or corrected.
- 6.3 Reviewers should keep an enumerated list of identified risk events from the project's scope, cost estimate, schedule, contract packaging, etc.



Risk shedding and sharing

- 6.2.1 Contractual Risk Allocation Review
 - Contractual Risk Allocation - develop a schedule of key contractual risk assignments, including:
 - contractually or implied retained, shed, or shared
 - cost sharing contingencies or limitations to liabilities for key parties
 - important risks not covered contractually
 - significant insurance provisions
 - Contractual Risk Allocation Compensation – does the estimate account for contractor pricing of risk?
 - Contractual Risk Allocation Assessment:
 - does the allocation of risk create an unbalanced cost burden to the project?
 - are there reasonable alternatives that should be otherwise considered?

Risk events

Risk categories

Risk register

Grantee risk register

PMOC risk register

IDENTIFICATION AND CATEGORIZATION OF RISKS – RISK REGISTER

Risk events

- **6.3.1 Risk Events**
 - Must contain four elements:
 - Description of a possible disruptive event to a known goal
 - A likelihood that it may happen
 - A significant magnitude of effect

Risk categories

- 6.3.2 Risk Categories - listed in chronological order, categorized as associated with the category during which the risk may be earliest and best mitigated.
 - Requirements Risk:
 - variability or lack of fundamental goals and conditions of a project
 - Design Risk:
 - variability of design-related activities occurring after Alternatives Analysis.
 - Market Risk:
 - variability in procurement of construction services, materials, and equipment including the open-market pricing of goods and services, and contract packaging strategies.
 - Construction Risk:
 - variability of the project's environment—including weather, subsurface conditions, and construction contractor failure, and performance risk.
- Categorization is important in establishing priorities and understanding if the Grantee's risk management is current.

The Risk Register

6.3 Identification and Categorization of Risks – Risk Register

- through prior analysis develop a synthesized list of identified risk events
- supplement with additional risk events through discussion with Grantee, including Grantee’s risk identification
- “Risk Register” includes
 - description of risk event, potential consequences and likelihood of occurrence;
 - SCC category and risk category; contract package; and potential actions to mitigate the risk.
- provides for risk mitigation action items, and Beta evaluation

The Risk Register

APPENDIX E

Standard Cost Categories	Rsk Cat.	Contr. Pkg	Risk Identification and Description		Risk Assessment 1= Low, 2=Medium, 3 =High				Action	
			Event	Outcomes	Prob p	Cost c	Schd s	Score p x (c+s)		
20 STATIONS, STOPS, TERMINALS										
20.01	At-grade station, stop, shelter, mall, terminal, platform	R	N/A	Provision to Add a fifth station EW alignment	Track Change and ROW acquisition	2	2	0	4	Monitor to ensure it does not requires a supplemental
		R	N/A	Replacement of parking eliminated	Re-stripe. Potential Added ROW					Parking Mitigation Plan/Management Plan Monitor to ensure it does not requires a

PROJECT RISK REGISTER			Low	Medium	High	Very High	Significant		
Regional Connector Transit Corridor Project			Legend	Score	1	2	3	4	5
Project No.			<= 3	Probability	< 10%	10-50%	50 - 75%	75 - 90%	> 90%
Rev:			3 - 10	Cost	< \$250K	\$250K - \$1M	\$1M - \$3M	\$3M - \$10M	> \$10M
Date Issue: Aug 2010			>= 10	Schedule	< 1 Mths	1 - 3 Mths	3-6 Mths	6 - 12 Mths	> 12 Mths
Risk ID	Risk Location	Risk Description	Comments & Notes			Probability Rating	Cost Impact (A)	Time Impact (B)	Risk Rating % x (A+B)/2

10 GUIDEWAY & TRACK ELEMENTS

10.06 Guideway: Underground cut & cover

82	Wye Connection from 2nd/Central Ave Station to the Metro Gold Line and the Portals	Y junction will require ventilation - jet fans will also be required at Portal ; costs may be underestimated	Jet fans are required to be located right before the portal. The "WYE" junction cavern will have to be fully ventilated and lighted ; costs may need to be increased as design evolves	5	4	0	10
46	Cut and Cover Tunnel along Flower Street	Flower Street cut and cover may have to be completely decked over during construction	Base assumption is decking only to be provided at street crossings / intersections (Note see Risk #47 specific to utility relocations on Flower Street)	3	5	0	7.5

Cost risk

Schedule risk

Special conditions

RISK ASSESSMENT

Cost risk

6.4.1 Cost Risk

- SCC cost workbook conditioning
- Beta assessment
- Running the cost risk workbook
- Interpreting the results

Cost risk

6.4.1.1 Standard Cost Category (SCC) Grantee Estimate Adjustments

Stripped Cost Estimate

- remove all contingency funds embedded therein
- include both unallocated funds and allocated funds; both patent and latent contingency funds
- involves interviews with the Grantee

Adjusted Cost Estimate

- revise the Stripped Cost Estimate,
- adjustments fully documented

Inflated to the year of expenditure (YOE)

- the inflation rate should be a rate that is stripped of contingency,

Adjusted Cost Estimate, appropriately stripped of contingencies, establishes a highly optimistic level of cost forecast for the various estimate line items, useful for assessing the range of risk for the line item.

Subsequent analyses of risk depend upon accurate estimate adjustments

Strive for consensus of the FTA, PMOC, and Grantee in such adjustments before moving forward with the risk assessment.

MAIN WORKSHEET-BUILD ALTERNATIVE

(Rev.13, June 1, 2010)

	Quantity	Base Year Dollars w/o Contingency (X000)	Base Year Dollars Allocated Contingency (X000)	Base Year Dollars TOTAL (X000)	Base Year Dollars Unit Cost (X000)	Base Year Dollars Percentage of Construction Cost	Base Year Dollars Percentage of Total Project Cost	YOE Dollars Total (X000)
10 GUIDEWAY & TRACK ELEMENTS (route miles)	9.00	90,000	10,000	100,000	\$ 12,000	44%	28%	123,881
10.01 Guideway: At-grade exclusive right-of-way	9.00	90,000	8,000	108,000	\$ 12,000			123,881
10.02 Guideway: At-grade semi-exclusive (allows cross-traffic)				0				0
80.05 Professional Liability and other Non-Construction Insurance		2,000	400	2,400				2,040
80.06 Legal; Permits; Review Fees by other agencies, cities, etc.		2,000	400	2,400				2,040
80.07 Surveys, Testing, Investigation, Inspection		2,000	400	2,400				2,040
80.08 Start up		2,000	400	2,400				2,040
Subtotal (10 - 80)	9.00	298,000	62,900	360,900	\$ 40,100		94%	382,286
90 UNALLOCATED CONTINGENCY				20,000			5%	21,062
Subtotal (10 - 90)	9.00			380,900	\$ 42,322		99%	403,348
100 FINANCE CHARGES				4,075			1%	4,500
Total Project Cost (10 - 100)	9.00			384,975	\$ 42,775		100%	407,848

Grantee's estimate				PMOC Adjustments		YOE Dollars				
Standard SCC Categories	Establish appropriate SCC-based line items, including sub-categories as necessary	Retrieve Grantee's project cost estimate information from SCC workbook		Establish PMOC Adjustments	Calculate Estimate	Identify inflation amounts and calculate inflated values				
		input from SCC workbook			calculated					
SCC	Category	Grantee Base Year Dollars Total	Base Year Dollars Allocated Contingency	Base Year Dollars w/o Contingency	PMOC Adjustments	Stripped, Adjusted Base Year Dollars Total	Estimate including Contingency	Estimate total without Contingency	Adjusted total including Contingency	Adjusted total without Contingency
SCC 10	Guideway	427,154	94,788	332,366	-8,086	324,280	519,871	403,731	509,049	393,909
	10.01 Guideway: At-grade exclusive right-of-way	46,250	10,457	35,793	-804	34,989	56,181	43,479	55,204	42,501
	10.02 Guideway: At-grade semi-exclusive (allows cross-traffic)	0	0	0	0	0	0	0	0	0
	10.03 Guideway: At-grade in mixed traffic	0	0	0	0	0	0	0	0	0
	10.04 Guideway: Aerial structure	56,476	12,768	43,708	-982	42,726	68,602	53,093	67,409	51,900
	80.06 Legal; Permits; Review Fees by other agencies, cities, etc.	0	0	0	0	0	0	0	0	0
	80.07 Surveys, Testing, Investigation, Inspection	0	0	0	0	0	0	0	0	0
	80.08 Start up	38,154	0	38,154	0	38,154	45,155	45,155	45,155	45,155
	SCC 10-80 total	1,981,819	286,091	1,695,728	-5,934	1,689,794	2,381,929	2,036,304	2,372,572	2,026,947
SCC 90	Unallocated Contingency (YOE \$)	0								
	Grantee's target base year project cost estimate	\$ 1,981,819					Total YOE Contingency:		345,625	

Cost risk

6.4.1.2 Standard Cost Category (SCC) Risk Assessment

Table 1 - Beta Range Factors by Risk Category

<u>Risk Category</u>	<u>Risk Category Factor</u>	
Requirements Risk	Per WOM direction	
Design Risk	0.50	
Market Risk	0.25	<u>Construction Risk Sub-Factor</u>
Construction Risk	0.70	
Early Construction		0.40
Mid Construction		0.15
Late Construction		0.15

Cost risk

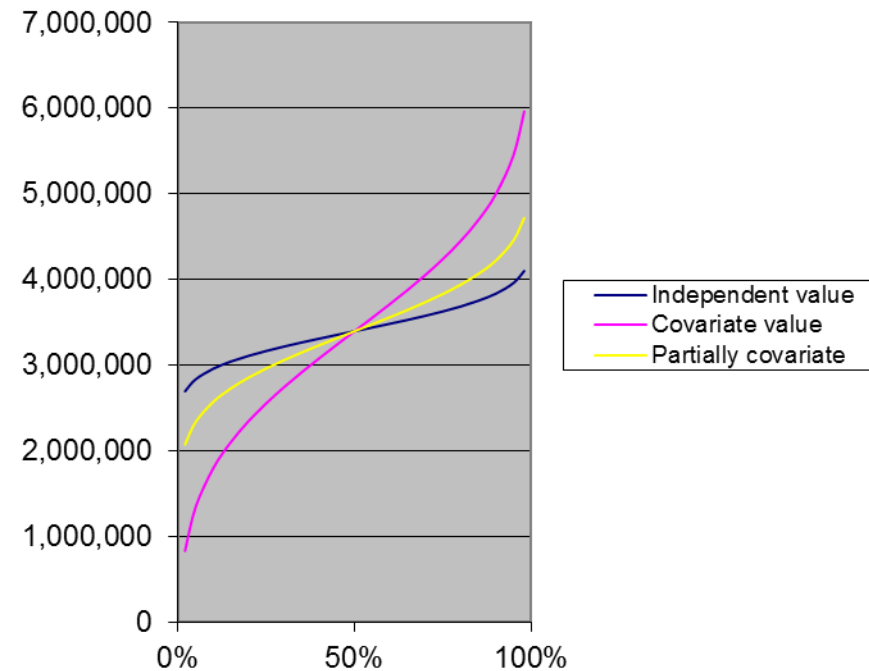
6.4.1.2 Standard Cost Category (SCC) Risk Assessment

Entry to Preliminary Engineering									
PMOC Input								Workbook calculations	
Utilize categories from previous analysis from prior worksheet			Establish Optimistic value (P10)	Establish Beta values, using FTA suggested values and adjusting based on identified risk events for SCC category and phase				Assign Beta value appropriate for phase	Calculate Pessimistic value (P90)
				input				calculated	calculated
SCC	Category	P10	Req'ts Beta	Dsgn Beta	Mkt Beta	Constr Beta	Post Constr Beta	Total Beta	P90
SCC 10	Guideway								
10.01	Guideway: At-grade exclusive right-of-way	42,501	0.00	0.50	0.25	0.70	0.05	2.50	106,254
10.02	Guideway: At-grade semi-exclusive (allows cross-traf	0	0.00	0.50	0.25	0.70	0.05	2.50	0
10.03	Guideway: At-grade in mixed traffic	0	0.00	0.50	0.25	0.70	0.05	2.50	0
10.04	Guideway: Aerial structure	51,900	0.00	0.50	0.25	0.70	0.05	2.50	129,749
10.05	Guideway: Built-up fill	0	0.00	0.50	0.25	0.70	0.05	2.50	0
10.06	Guideway: Underground cut & cover	37,238	0.00	0.50	0.25	0.70	0.05	2.50	93,094
10.07	Guideway: Underground tunnel	0	0.00	0.50	0.25	0.70	0.05	2.50	0
80.05	Professional Liability and other Non-Construction Insi	0	0.00	0.30	0.25	0.15	0.05	1.75	0
80.06	Legal; Permits; Review Fees by other agencies, citie	0	0.00	0.60	0.50	0.25	0.05	2.40	0
80.07	Surveys, Testing, Investigation, Inspection	0	0.00	0.40	0.45	0.50	0.05	2.40	0
80.08	Start up	45,155	0.00	0.60	0.25	0.60	0.05	2.50	112,888

Cost risk

6.4.1.3 Project Level Cost Risk Assessment

Workbook calculations			
establish probability intervals	Establish likely value at probability interval	Calculate 1/3 covariate condition	Establish likely value at probability interval
pre-established	calculated	calculated	calculated
Likelihood	Independent value	Partially covariate	Covariate value
2%	2,694,574	2,074,134	833,253
5%	2,834,323	2,337,410	1,343,585
10%	2,958,489	2,571,330	1,797,013
15%	3,042,263	2,729,155	2,102,939
20%	3,108,844	2,854,589	2,346,079
25%	3,165,965	2,962,201	2,554,672
30%	3,217,261	3,058,839	2,741,995
35%	3,264,795	3,148,389	2,915,577
40%	3,309,899	3,233,363	3,080,290
45%	3,353,539	3,315,576	3,239,651
50%	3,396,486	3,396,486	3,396,486
55%	3,439,434	3,477,396	3,553,321
60%	3,483,073	3,559,609	3,712,682
65%	3,528,177	3,644,583	3,877,395
70%	3,575,711	3,734,133	4,050,978
75%	3,627,007	3,830,771	4,238,300
80%	3,684,128	3,938,383	4,446,893
85%	3,750,709	4,063,817	4,690,033
90%	3,834,483	4,221,642	4,995,959
95%	3,958,649	4,455,562	5,449,388
98%	4,098,398	4,718,838	5,959,720



Cost risk workbook

Interpreting the results

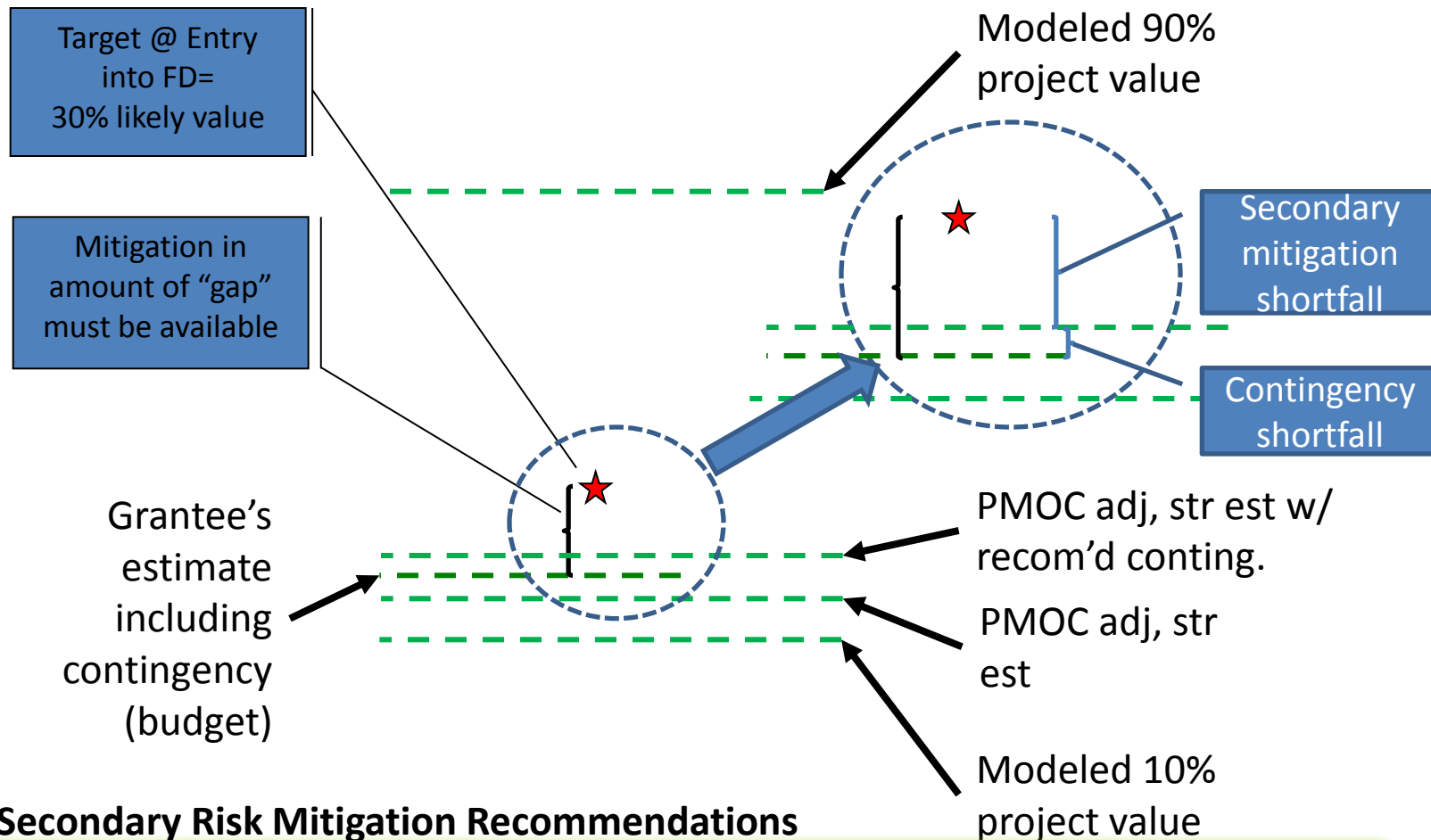
<i>OP40 values</i>		<i>Calculated Values</i>						
<i>Phased Milestones</i>	<i>Phase</i>	<i>10%</i>	<i>50%</i>	<i>90%</i>	<i>Secondary Mitigation Target</i>	<i>Grantee Project Estimate</i>	<i>Grantee Project Estimate w/o Conting</i>	<i>Grantee Total YOE Contingency</i>
						Entry into Preliminary Engineering	PE	2,571,330
Entry into Final Design	FD	2,514,592	3,224,644	3,934,695	2,934,096	2,381,929	2,036,304	
FFGA Award	FFGA	2,435,904	2,988,644	3,541,384	2,988,644	2,381,929	2,036,304	
40% Bid	40% Bid	2,362,073	2,788,405	3,214,738	2,872,686	2,381,929	2,036,304	
20% Construction	20% Constr	2,283,804	2,596,100	2,908,396	2,723,889	2,381,929	2,036,304	
50% Construction	50% Constr	2,184,109	2,371,597	2,559,085	2,494,724	2,381,929	2,036,304	
75% Construction	75% Constr	2,138,653	2,264,689	2,390,725	2,366,619	2,381,929	2,036,304	
90% Construction	90% Constr	2,077,833	2,132,842	2,187,851	2,187,851	2,381,929	2,036,304	

6.5.4 Project Cost Contingency

<i>Contingency Analysis</i>				
<i>Phased Milestones</i>	<i>Min. Conting. % Targets</i>	<i>PMOC YOE Stripped Estimate</i>	<i>Min. Conting'cy Amounts</i>	<i>Conting'cy Target</i>
Entry into Preliminary Engineering	30%	2,026,947	608,084	2,635,031
Entry into Final Design	20%		405,389	2,432,330
FFGA Award	15%		304,042	2,330,989
40% Bid	12%		243,234	2,270,181
20% Construction	10%		202,695	2,229,642
50% Construction	8.5%		172,290	2,199,238
75% Construction	6.5%		131,752	2,158,699
90% Construction	5.0%		101,347	2,128,294

Focus on current phase

Secondary Mitigation



6.5.3 Secondary Risk Mitigation Recommendations

carefully consider the effect of Secondary Mitigation on FFGA scope when making recommendations regarding Secondary Mitigation.

Schedule risk

6.4.2 Project Schedule Risk

- Conditioning the schedule
- Running the schedule risk model
- Schedule contingency
- Interpreting the results

Schedule risk

6.4.2.1 Grantee Schedule Adjustments

Stripped Schedule

- adjust Grantee's schedule to remove all contingency durations
- particular attention should be paid to contingent durations that may be embedded as lag time hidden within the activity logic ties.

Adjusted Schedule

- provide suggested revisions to the Stripped Schedule
- any adjustments should be fully documented
- adjustments may be applied to the Summary Schedule, described below.

Subsequent analyses of risk depend upon accurate schedule adjustments.

Strive for consensus of the FTA, PMOC, and Grantee before moving forward with the schedule risk assessment.

Schedule risk

6.4.2.2 Summary Schedule Development

- develop a summary schedule that will be used for modeling project schedule risk
- strike a reasonable balance between transparency and level of detail required for sufficient risk assessment.

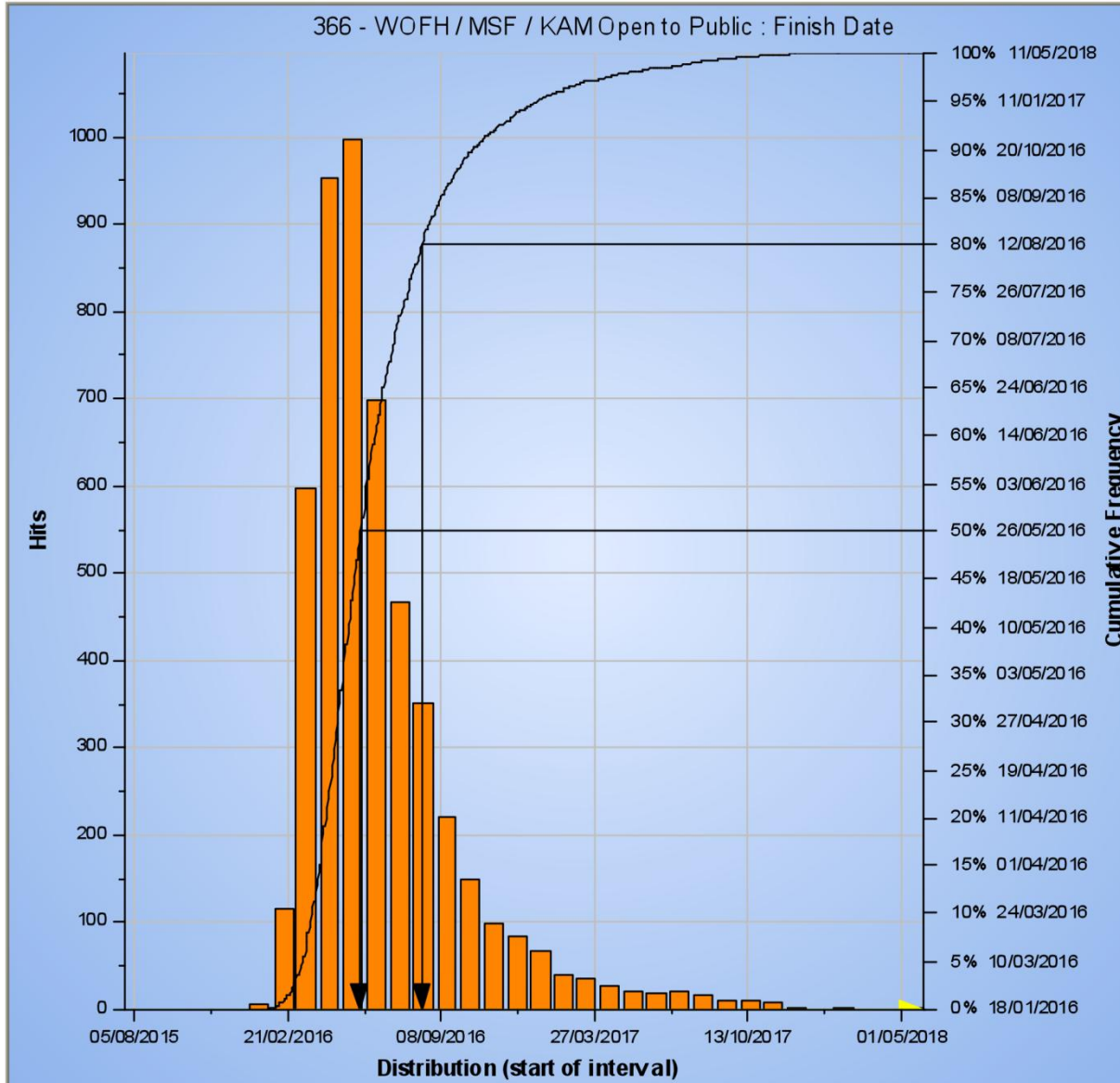
6.4.2.3 Schedule Activity Risk Assessment

- establish duration ranges for the activities of the Summarized Schedule, especially including those noted in the Risk Register
- the “adjusted” schedule duration establishes the optimistic estimate for the project
- the PMOC shall use its professional judgment to establish the most likely and pessimistic estimates for the activity duration, or other parameters required for the stochastic analysis
- Use a commercially-available project scheduling system that is capable of stochastic (Monte-Carlo) modeling

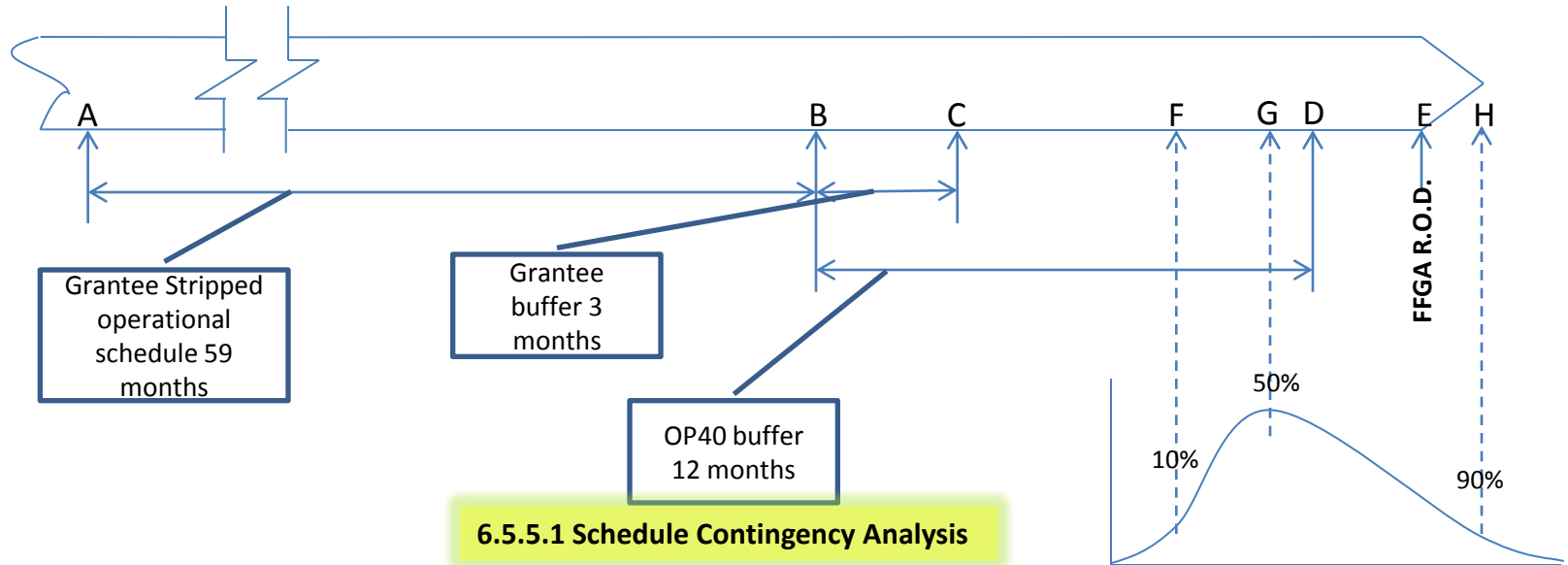
6.4.2.4 Project Level Schedule Risk Assessment

- assess the likelihood of project completion dates

Schedule risk



Schedule risk



6.4.2.4 Project Level Schedule Risk Assessment

- A. Start of FD – 11/10
- B. Grantee’s operational schedule less grantee buffer – 10/15
- C. Grantee’s operational schedule incl. grantee buffer – 01/16
- D. Grantee’s operation schedule less grantee buffer + OP40 buffer – 10/16
- E. FFGA R.O.D. – 12/16
- F. PMOC risk model 10% - 6/16
- G. PMOC risk model 50% - 9/16
- H. PMOC risk model 90% - 2/17

Special conditions

Risk and contingency evaluation:

- in alternate project delivery forms
- under multiple contracts at differing phases
- during construction

Special conditions

alternate project delivery forms:

PPP, DB, DBOM, DBFOM, etc.

- Construction pricing is known earlier
- Design risk is largely (but not completely) contained within contractors

Customize the Beta values by risk type to respond to the special conditions:

$$\beta_T = \beta_R + \beta_D + \beta_M + \beta_C$$

- Requirements risk – generally remain with the agency under any delivery form, reduce only cautiously
- Design risk – may likely be substantially reduced if design is well-defined initially
- Market risk – may likely be reduced to zero or nearly zero if constr. Price is guaranteed
- Construction risk – construction risk remains similar to that in a DBB contract form.

Special conditions

Multiple phase projects may have projects in differing states of completion, often separated by contracts:

- Design stages (PE, FD)
- Procurement, contracted or negotiated
- In construction

Develop a weighted analysis for cost risk by SCC subcode, then develop the risk

curve:

$$\beta_{RC_T} = \sum_{i=1}^n \left[\frac{Est_i}{Est_T} \beta_{RC_i} \right]$$

where, for each SCC subcode:

$\beta_{RC_i} = \beta$, for each individual risk category

n=number of contracts, i ;

Est _{i} =estimate of contract i ;

Est _{T} =total estimate of all contracts n ;

Develop a weighted analysis for cost contingency recommendations for the

project:

$$C_T = \sum_{i=1}^n \left[\frac{Est_i}{Est_T} C_i \right]$$

where, for each contract:

C_i = Contingency recommended for the contract

n=number of contracts, i ;

C_i =estimate of contract i ;

C_T =total estimate of all contracts n ;

Special conditions

during construction

- the Beta analysis works well in the early phases
- in construction, unknowns have been reduced and knowns are more clear
- change management system evaluation and understanding of retained risk form the basis of project-level risk
- risk and contingency tracking and monitoring should continue

Risk mitigation types

Primary risk mitigation

Secondary risk mitigation

Cost contingencies

Schedule contingencies

6.5.1 RISK MITIGATION

Risk mitigation types

6.5.1.2 Mitigation Types

Risk Avoidance

- alternate delivered through a less-risky process or design, or may be altogether eliminated

Risk Transfer

- a risk event becomes the responsibility of a party other than the Grantee;
- may include a partial transfer (or risk sharing)
- may be to a third party such as a contractor, consultant, or other organization in the form of contract requirements, warranties, or insurance policies, etc.

Risk Reduction

- either reduce the consequence or the likelihood of a risk event
- may increase cost in exchange for lower risk

Risk Acceptance

- when further reduction of a particular risk would only come at the expense of the project's fundamental goals
- may also deal with risks of high impact yet low level of probability
- requires cost or schedule contingencies

Integrate mitigations into risk register, indicate mitigation type.

Prioritize solutions in the order shown.

Choices reduce as project proceeds, at some point Risk Acceptance may be only practical solution.

Primary risk mitigation

6.5.2 Primary Risk Mitigation Recommendations

- planned actions of the Grantee and its consultants and contractors as described in the Risk Management Plan portion of the Project Management Plan, as supplemented with the PMOC's recommendations (6.5.1.1)
- include scope, deliverables, outcomes, and recommended completion dates
- directly related to performance by the Grantee, as well as its consultants
- Include progress-reporting intervals for tracking the performance of mitigation measures
- schedule risk mitigation should treat both critical path and non-critical path activities
- protect the critical path from non-critical path activities becoming critical themselves
- general principle: activities with high schedule risk should start and complete as soon as feasible.

assign priority completion of mitigation activities by risk-category, mitigation-type, and high risk

Secondary risk mitigation

6.5.3 Secondary Risk Mitigation Recommendations

- pre-planned, potential scope or process changes that may be triggered when risk events occur that cause overruns of certain phase-based targets (6.5.1.1)
- review and supplement Grantee's recommendations for activities to accomplish development of Secondary Risk Mitigation capacity
- include targeted magnitude of the cost or time savings expected, scope, deliverables, and outcomes of the activity
- include progress-reporting intervals for tracking the utilization and management
- integration with the Grantee's overall program schedule
- Mitigation Targets are developed using probability curves in the FTA cost risk assessment workbook (see Table 2)

modify these targets based upon project specifics

carefully consider:

***current status of design efficiency and
effect on FFGA scope***

Cost contingencies

6.5.4 Project Cost Contingency

- identify, describe, and analyze the adequacy of the grantee's cost contingencies
- consider: 1) the Beta Range Factor model; 2) a "forward pass"; and 3) a "backward pass"
- use professional judgment

6.5.4.1 Forward Pass Cost Contingency Analysis

- Use OP40 recommended values
- interpolate based on multiple phases
- base recommendation on actual completion, which may vary from FTA completion stage (i.e., entry to PE, etc.)

6.5.4.2 Backward Pass Cost Contingency Analysis

- consider minimum contingency required at the final stages of the project , re-evaluate for another point in time when the project is less complete, moving stage by stage toward the beginning of the project
- detailed recommendations are made in OP40.

6.5.4.3 Cost Contingency Recommendation

- establish a tabular and graphical Cost Contingency Curve that indicates minimum levels of contingency
- Grantee must maintain contingency and tracking and should be tasked with contingency draw-down calculation
- minimum levels should be indicated for each of the FTA milestones, including points of time at which significant changes in risk may occur

These milestones are important control points and are monitored to protect from inappropriately early draw down of contingency funds.

Schedule contingencies

6.5.5 Project Schedule Contingency Review

- schedule contingency may also be called “buffer” or “buffer float”
- developed through consideration of project conditions
- recommend minimums for inclusion in the Grantee’s Project Management Plan and supporting schedules

6.5.5.1 Schedule Contingency Analysis

- accumulates minimums for risky activities from end of project toward start, on critical and non-critical paths
- may be applied at the summary schedule level
- recommendations similar to cost-related “forward-pass” given in OP40

6.5.5.2 Schedule Contingency Recommendations

- establish a tabular and graphical Schedule Contingency Curve that indicates minimum levels of contingency
- Grantee must maintain contingency and tracking and should be tasked with contingency draw-down calculation
- minimum levels should be indicated for each of the FTA milestones, including points of time at which significant changes in risk may occur

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OP-40 management:

**Development of Grantee's Risk and Contingency
Management Plan (RCMP)**

Risk review report

**PMOC's Monitoring of Grantee's Risk and
Contingency Management Plan**



PMP

RCMP structure

DEVELOPMENT OF GRANTEE'S RISK AND CONTINGENCY MANAGEMENT PLAN (RCMP)

Project management plan (PMP)

Oversight Procedure 20 - Project Management Plan Review

Appendix B: PMP Table of Contents

PMP Table of Contents (con't)		In AA and/or Req. Entry to PE	In PE, Adv. PE, and/or Req. entry to FD	In FD and/or Req. FFGA	In Bid / Award and / or Constr.
4. Project Controls (con't)					
	Contingency Management		▲	●	○
	Contracting techniques		▲	●	○
	Cost allocation		▲	●	○
	Procedures for working with construction contractors to maintain SCC Cost Breakdown of contract sum through construction, at contract closeout.		▲	●	○
Schedule Control Procedures					
	Description of Scheduling Methods and Assumptions	▲	●		
	Procedures for updating Baseline Project Schedule		▲	●	○
	Procedures for keeping the project on schedule		▲	●	○
Risk Control Procedures					
	Description of risk identification procedures pertaining to project team organization, scope, cost, schedule, quality;	▲	●	○	
	Risk identification in project team; drawings; General and Supplementary Conditions; Div. 1, Div. 2 – 48 Technical Specifications				
	Risk evaluation / assessment plan and procedures	▲	●	○	
	Risk control and management plan and procedures	▲	●	○	○
	Contingency control and management plan and procedures including establishment of minimum contingency levels at each milestone (contingency drawdown)	▲	●	○	○
	Role of Insurance	▲	●	○	
Dispute / Conflict Resolution Plan (claims avoidance and claims resolution)					
	Plan for Design Phases	▲	▲		

NOTE: ▲ – Preliminary information required; ● – Element to be completed; ○ – Element to be modified or augmented with additional information as necessary.

Grantee's Risk and Contingency Management Plan (RCMP) is a part of its PMP

RCMP structure

6.6 Development of Grantee's Risk and Contingency Management Plan (RCMP)

- make available to the Grantee assessments and recommendations of OP40
- work collaboratively with the Grantee
- Grantee prepares the Risk and Contingency Management Plan (RCMP)
- Grantee reflects the recommendations of the PMOC.

Ensure RCMP considers recommended in Appendix G

RCMP structure

APPENDIX G

Risk and Contingency Management Plan (RCMP) Structure

- **Overview**
- **Goals and Objectives**
- **Insurance**
- **Primary Mitigation**
 - Technical Capacity
 - Project Scoping and Design
 - Construction Process
 - Project Tracking
- **Contingency Management**
- **Secondary Mitigation**
- **Risk Management and Risk Mitigation**

Monitoring of the RCMP is by both the Grantee and the FTA (through the PMOC).

Work collaboratively and develop agreement on the substance of the RCMP.

Reporting process

OP-40 report structure

PMOC RISK REVIEW REPORT

Reporting process

7.0 REPORT, PRESENTATION, RECONCILIATION

- provide a written report
- obtain FTA approval
- share the report with the Grantee
- reconcile differences of opinion (if FTA directs), provide a report addendum

- OP-1 report formatting
- Appendix H structure

OP-40 Risk review report

APPENDIX H

Risk Report Format

Timely reporting facilitates Grantee's early adoption of the risk mitigation into its PMP.

- **Title Page**
- **Table of Contents**
- **List of Figures and Tables**
- **Executive Summary**
- **Project Background**
- **Summary of Project Status from other OPs.**
- **Contract Packaging Review**
- **Risk Identification**
- **Risk Assessment**
- **Risk Mitigation**
- **Monitoring Plan Basis**
- **Conclusion**
- **Appendices**
 - **Risk Register**
 - **Grantee Data Characterization.**

Monitoring focus

Monitoring reports

PMOC'S MONITORING OF GRANTEE'S RISK AND CONTINGENCY MANAGEMENT PLAN

Risk monitoring focus

6.7 PMOC's Monitoring of Grantee's Risk and Contingency Management Plan

- assess and ensure Grantee achieves its risk management objectives and targets
- use the Grantee's Risk and Contingency Management Plan (RCMP) as the monitoring guide

Specifically:

- prosecution of Primary Mitigation action items;
- occurrence of risk events and their effect;
- use of cost and/or schedule contingencies and status of control points;
- implementation of other RCMP initiatives; and
- effectiveness of Grantee's risk organization

Monitoring reports

Oversight Procedure 25 - Recurring Oversight and Related Reports

6.2 Monthly Meetings and Supporting Reports

- The PMOC absorbs and assesses the status of the project, including challenges, upcoming events, milestones passed, etc.
- **6.2.2 Comprehensive Monthly Report**
 - 6) Project Risk: Indicate date of initial risk assessment and risk updates; status of risk management – treatment of top risks and related mitigation actions including contingencies

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Organizing the risk review

